

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
OFFICE OF QUALITY ASSURANCE**

**AUDIT REPORT YMSCO-ARC-98-17**

**OF THE**

**U. S. DEPARTMENT OF ENERGY  
YUCCA MOUNTAIN SITE CHARACTERIZATION OFFICE**

**LAS VEGAS, NEVADA**

**AUGUST 3 - 7, 1998**

**Prepared by:\_\_\_\_\_**

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**Date:\_\_\_\_\_**

**Approved by:\_\_\_\_\_**

**Robert W. Clark  
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Office of Quality Assurance**

**Date:\_\_\_\_\_**

## **1.0 EXECUTIVE SUMMARY**

As a result of Quality Assurance (QA) Audit YMSCO-ARC-98-17, the audit team determined that the U.S. Department of Energy (DOE), Office of Civilian Radioactive Waste Management (OCRWM), Yucca Mountain Site Characterization Office (YMSCO), with the exception of non-implemented program elements and areas where deficiencies existed, is satisfactorily implementing applicable portions of the QA Program described in the OCRWM Quality Assurance Requirements and Description (QARD) document, DOE/RW-0333P, Revision 8; and the OCRWM and YMSCO implementing procedures. QA Program Elements 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0; and Supplements II, III and V were found satisfactory by the audit team. The audit team determined that there was no implementation by YMSCO of Appendix C requirements. In addition, QA Program Element 8.0, Supplements I and IV, and Appendices A and B are not applicable to YMSCO activities.

The audit team identified two deficiencies during the course of the audit that resulted in the issuance of two Deficiency Reports (DR) described in Section 5.5.1 of this report. There were seven deficiencies identified by the audit team that were corrected prior to the post-audit meeting. These conditions are described in Section 5.5.2 of this report. Additionally, there were nine recommendations resulting from the audit that are detailed in Section 6.0 of the report.

## **2.0 SCOPE**

The audit was conducted to evaluate the adequacy, compliance, and effectiveness of YMSCO in implementing the QA Program as described in the QARD; and the OCRWM and YMSCO implementing procedures.

The following QA Program Elements/Requirements were evaluated during the audit, in accordance with the approved audit plan:

### **QA PROGRAM ELEMENTS/REQUIREMENTS**

1.0	Organization
2.0	Quality Assurance Program
3.0	Design Control
4.0	Procurement Document Control
5.0	Implementing Documents
6.0	Document Control
7.0	Control of Purchased Items and Services
9.0	Control of Special Processes
10.0	Inspection

11.0	Test Control
12.0	Control of Measuring and Test Equipment
13.0	Handling, Storage and Shipping
14.0	Inspection, Test and Operating Status
15.0	Nonconformances
16.0	Corrective Action
17.0	Quality Assurance Records
18.0	Audits
Supplement II	Sample Control
Supplement III	Scientific Investigation
Supplement V	Control of the Electronic Management of Data
Appendix C	Mined Geologic Disposal System

The following QA Program Elements/Requirements were not reviewed during the audit because they are not applicable to the YMSCO scope of work:

8.0	Identification and Control of Items
Supplement I	Software
Supplement IV	Field Surveying
Appendix A	High-Level Waste Form Production
Appendix B	Storage and Transportation

### 3.0 AUDIT TEAM AND OBSERVERS

The following is a list of audit team members and their assigned areas of responsibility:

<u>Name/Title/Organization</u>	<u>QA Program Elements/Requirements, Technical Areas, Processes, Activities or End-Products</u>
Gary D. Wood, Audit Team Leader, Office of Quality Assurance (OQA)	1.0, 2.0, 4.0, and 7.0
Michael A. Goyda, Auditor, OQA	5.0, 10.0, 11.0, 12.0, 14.0, 15.0, Supplement II, and Appendix C
Richard L. Weeks, Auditor, OQA	2.0, 3.0, 5.0, 18.0, and Supplements III and V
Samuel H. Horton, Auditor, OQA	9.0, 10.0, 11.0, 12.0, 13.0, 14.0
Emily S. Reiter, Auditor, OQA	2.0 and 17.0

Ardell M. Whiteside, Auditor, OQA	2.0, 7.0, 16.0, and 18.0.
Charles C. Warren, Auditor, OQA	2.0, 3.0 and Supplement III
Michael Malone, Auditor, OQA	5.0 and 6.0

#### **4.0 AUDIT MEETINGS AND PERSONNEL CONTACTED**

The pre-audit meeting was held at the YMSCO offices in Las Vegas, Nevada, on August 3, 1998. A daily debriefing and coordination meeting was held with the YMSCO management, and daily audit team meetings were held to discuss issues and potential deficiencies. The audit was concluded with a post-audit meeting held at the YMSCO offices on August 7, 1998. Personnel contacted during the audit are listed in Attachment 1. The list includes those who attended the pre-audit and post-audit meetings.

#### **5.0 SUMMARY OF AUDIT RESULTS**

##### **5.1 Program Effectiveness**

The audit team concluded that, overall, the QA Program is adequate and is being effectively implemented by YMSCO for the scope of this audit. The results for each program element evaluated are contained in Attachment 2, Summary Table of Audit Results.

##### **5.2 Stop Work or Immediate Corrective Actions Taken**

There were no stop work orders, immediate corrective actions or related additional items resulting from this audit.

##### **5.3 QA Program Audit Activities**

A summary table of audit results is provided in Attachment 2. The audit checklists contain the details of the audit evaluation along with identification of the objective evidence reviewed. The checklists are maintained as QA Records.

##### **5.4 Technical Audit Activities**

There were no technical activities evaluated during the audit.

## **5.5 Summary of Deficiencies**

The audit team identified two deficiencies during the audit for which two DRs have been issued. Seven additional deficiencies were identified and corrected prior to the post-audit meeting.

Synopses of the deficiencies documented as DRs and those corrected during the audit are detailed below. The DRs have been transmitted under a separate letter.

### **5.5.1 Deficiency Reports**

#### **YMSCO-98-D-125**

This DR documents that the Requirements Traceability Network Report for OCRWM has not been revised to reflect changes (i.e., revisions and cancellations) to implementing documents.

#### **YMSCO-98-D-126**

This DR documents the following deficiencies:

Record packages stored in Technical Publication Management were not being stored in accordance with the requirements for interim storage contained in procedure AP-17.1Q, *Record Source Responsibilities for Inclusionary Records*. Three record packages were identified in which the individual records did not contain the required retention time designator (e.g., Lifetime or Nonpermanent). Furthermore, none of these records had been submitted to the Civilian Radioactive Waste Management System Management and Operating Contractor (CRWMS M&O) Records Processing Center (RPC) within 90 days of completion as required by procedure AP-17.1Q.

An additional example of this deficiency was identified during the audit in Las Vegas. Inspector qualification records packages for OQA inspection personnel had not been submitted to the RPC within 90 days of completion and were not being stored in accordance with the requirements for interim storage contained in procedure AP-17.1Q. The remedial action to correct this example of the deficiency was completed during the audit. The inspector qualification records packages were submitted to the RPC prior to the post-audit conference.

### 5.5.2 Deficiencies Corrected During the Audit

The following deficiencies were identified and corrected during the audit:

- 1) The date of the QA Director's approval was missing from one of six QA surveillance reports reviewed by the auditor. The date was added and the report was resubmitted to the RPC.
- 2) One QA surveillance report identified that deficiencies had been corrected during the surveillance. There was no objective evidence that Deficiency Document Encoding Forms (DDEF) were generated as required by procedure AP-16.3Q, *Trend Evaluation and Reporting*. The required DDEFs were prepared and processed prior to the audit exit meeting.
- 3) Two of six annual supplier evaluations were overdue, one by two months, the other by 11 months. In addition, there were five separate instances of inconsistency between the Quality Suppliers List (QSL) and the corresponding Supplier Evaluation Reports (SER). These inconsistencies were comprised of typographical errors and/or the use of different abbreviations, etc. (i.e., QAM versus QSM). OQA personnel reviewed the entire QSL and identified two additional overdue supplier evaluations. Further OQA investigation revealed that two of the four supplier evaluations identified as overdue had been completed and the SERs were in process; however, the QSL could not be updated to reflect the dates of the completed supplier evaluations until the SERs were fully processed. These conditions adverse to quality were corrected during the audit. For the two remaining overdue supplier evaluations, OQA personnel completed the supplier evaluations and initiated the SERs. These SERs were approved by OQA prior to completion of the audit. The five instances of inconsistency between the QSL and the SERs were corrected and the QSL was updated to reflect these changes.
- 4) One of the DRs reviewed by the auditor stated that a root cause determination was required. The AP-16.4Q, *Root Cause Determination*, required documentation of root cause could not be found in the record package. Further investigation revealed that a root cause analysis was not required for the deficiency identified in the DR. The DR was corrected to remove the requirement for root cause determination and submitted to the RPC.
- 5) Objective evidence of verification of minimum education and

experience was missing from the training folders for two YMSCO Management and Technical Support Services personnel. This was corrected during the audit by placing required letters in the training folders that attest to the fact that the employees meet the minimum education and experience requirements.

- 6) A Training Assignment Sheet (TAS) for one YMSCO employee indicated that QA related activities were added to the TAS but no additional tasks or responsibilities were described. The responsible supervisor corrected the TAS to state that QA related activities were deleted, not added. The corrected TAS was placed into the employees training folder.
- 7) A request for clarification form located in the OQA Library did not have a green “managed copy” stamp indicated as required. During the audit, a new form was issued to the OQA Library with the correct stamp.

## 6.0 RECOMMENDATIONS

The following recommendations resulted from the audit and are presented for consideration by the YMSCO management:

- 1) Conduct an independent OQA verification activity of the newly revised AP-16.3Q trending program after issuance of the first trend report to verify completeness and accuracy.
- 2) Institute management overview and tracking system for assuring that the QSL information is current and accurate.
- 3) Continue to improve and streamline supplier information, QSL, and SER packages. Consider combining AP-7.4Q, *Maintenance of the Office of Civilian Radioactive Waste Management Qualified Suppliers List*; and QAP-7.2, *Supplier Evaluation*, to describe the work process in sequential steps and to eliminate having to refer to both procedures to accomplish the work.
- 4) YLP 10.1Q, *Concrete Batch Plant Inspection*, Paragraph 5.3, sub-items 1-13, requires that Quality Control personnel monitor the batch plant for a litany of attributes. However, the existing documentation lists only identified exceptions, rather than specifically identifying each attribute to be monitored. It is recommended that a formal checklist be developed and incorporated into YAP 10.1Q to ensure that each of the batch plant activities required to be monitored are in fact checked.
- 5) YLP 10.6Q, *Laboratory Curing, Compression Testing, and Reporting for*

*Cementitious materials*, Paragraph 5.2h, requires that 8 shotcrete cores be extracted and tested per ASTM C42. Documentation noted on the form titled “Compression Test Report for Cores,” shows six core samples taken. It was verified via physical evidence that eight cores were taken, but two of the cores were considered “extras” and were broken at the discretion of the Architect/Engineer. It is recommended that the documentation for shotcrete cores show eight cores with a notation that cores seven and eight were extras.

- 6) The QSL information should provide for explanations of “in-process” actions or other clarifying notes which would assure QSL users are aware of the current status of the supplier and any pending action.
- 7) OQA needs to describe a process by which new examples of a deficiency may be referenced to an existing deficiency document such that the QAR may verify and close the existing deficiency giving due consideration to all referenced deficiency examples. (e.g., The verification statement from the closeout of DR YM-97-D-102 states that corrective action will be verified and closed as part of DR YM-97-D-078.)
- 8) Modify the forms in the Automated Forms System to provide for identifying a completed form as “QA lifetime” or “QA nonpermanent.”
- 9) Several of the YMSCO responsibilities in YLP-2.1Q-YMSCO, *Yucca Mountain Site Characterization Office Qualification and Training*, have been delegated to the CRWMS M&O. The CRWMS M&O is implementing CRWMS M&O procedure QAP-2.1, *Indoctrination and Training*, to fulfill the delegated responsibilities. It is recommended that YLP-2.1Q be revised to address the delegated responsibilities and the fact that the CRWMS M&O utilizes different forms in meeting procedure requirements.

## **7.0 LIST OF ATTACHMENTS**

Attachment 1: Personnel Contacted During the Audit

Attachment 2: Summary Table of Audit Results



**ATTACHMENT 1**  
**PERSONNEL CONTACTED DURING THE AUDIT**

<u>Name</u>	<u>Organization/Title</u>	<u>Pre-Audit Meeting</u>	<u>Contacted During Audit</u>	<u>Post-Audit Meeting</u>
Adams, Jeri	DOE/YMSCO		X	X
Auer, Patrick	OQA/QATSS		X	
Blaylock, James	DOE/OQA	X	X	X
Clark, Robert	DOE/OQA	X	X	
Compton, James	DOE/YMSCO	X	X	X
Cooper, Emily	DOE/YMSCO	X		X
Daniel, Paul	MTS/BAH		X	
Devers, John	OQA/QATSS		X	
Diaz, Mario	DOE/OQA	X		
Dyer, Russell	DOE/YMSCO	X		
E. Kent Williams	OQA/QATSS		X	
Fogdall, Steve	M&O/SAIC	X		X
Fox, Charles	DOE/YMSCO		X	
Glasser, William	OQA/QATSS		X	
Greene, Henry	OQA/QATSS	X	X	X
Gregory, Wayne	M&O/Duke		X	
Habbe, Robert	OQA/QATSS		X	
Hamilton-Ray, Birdie	DOE/YMSCO.	X	X	
Hampton, Catherine	DOE/OQA	X	X	
Harper, Forbie	M&O/KIEWIT		X	
Hudson, Woody	OQA/QATSS			X
Justice, Judy	M&O/Duke		X	X
Keller, David	M&O/SAIC			X
Kettell, Richard	OQA/QATSS		X	
Kevin Harbert	M&O/TRW		X	
Kirby, Debra	OQA/QATSS		X	
Klimas, Daniel	OQA/QATSS		X	
Kozai, Wayne	DOE/YMSCO	X	X	X
Linden, Ronald	MTS/GOLDER		X	
Martin, John	OQA/QATSS	X	X	X
Martin, Melinda	MTS/BAH		X	
Maudlin, Richard	OQA/QATSS		X	
Mayo, Christine	DOE/YMSCO	X		
Mele, Raymond	MTS/BAH	X	X	
Moore, Sandra	M&O/TRW	X	X	
Mueller, Terry	M&O/TRW	X	X	X
Murray, Robert	MTS/BAH		X	
Newbury, Claudia	DOE/YMSCO		X	

<u>Name</u>	<u>Organization/Title</u>	<u>Pre-Audit Meeting</u>	<u>Contacted During Audit</u>	<u>Post-Audit Meeting</u>
Noel, Richard	OQA/QATSS		X	
Nusebaum, Mary Ann	M&O/TRW		X	X
Osborne, David	OQA/QATSS		X	
Powe, Richard	OQA/QATSS		X	X
Rael, Howard	M&O/SAIC		X	
Ridolfi, Diane	DOE/YMSCO		X	
Rost, Lauretta	DOE/YMSCO	X	X	
Rouse, Sandra	DOE/YMSCO	X	X	X
Ruiz, Mike	DOE/YMSCO			X
Spangler, Elaine	M&O/SAIC		X	
Spence, Richard	DOE/YMSCO	X	X	
Stemley, Ernest	M&O/TRW		X	
Sult, Debra	OQA/QATSS		X	
Terrell, Bertha	DOE/YMSCO	X		
Therien, John	OQA/QATSS	X	X	
Thompson, Kathleen	M&O/TRW		X	
Tunney, Daniel	OQA/QATSS		X	
Tynan, Mark	DOE/YMSCO		X	
Verden, Jan	MTS/BAH	X		
Wagner, Lester	OQA/QATSS		X	
Warriner, David	DOE/YMSCO	X		
Weber, Carl	DOE/OQA	X		X
Williams, Albert	DOE/OQA	X		X
Yasek, Robert	DOE/YMSCO		X	

**LEGEND:**

BAH.....Booze Allen and Hamilton  
 DOE.....U.S. Department of Energy  
 Duke.....Duke Engineering  
 GOLDER...Golder Associates  
 KIEWIT.....Kiewit/Parsons Brinckerhoff  
 M&O..... Civilian Radioactive Waste Management System Management and Operating Contractor  
 MTS.....Management & Technical Support Services  
 OQA.....Office of Quality Assurance  
 QATSS.....Quality Assurance Technical Support Services  
 SAIC.....Science Applications International Corporation  
 TRW.....TRW Environmental Safety Systems  
 YMSCO....Yucca Mountain Site Characterization Office

**ATTACHMENT 2**  
**SUMMARY TABLE OF AUDIT RESULTS**

QA Element	Document Reviewed	Details (Checklist)	Deficiencies	Recommendations	Program Adequacy	Procedure Adequacy	Overall
1.0	QAP 1.1, Revision 4	Pgs. 1-2			SAT	SAT	SAT
	YLP 1.1-Q-YMSCO, Revision 2	Pgs. 3-4			SAT	SAT	
2.0	QAP 2.4, Revision 2	Pgs. 5-9			SAT	SAT	SAT
	QAP 2.5, Revision 1	Pgs. 10-12			SAT	SAT	
	QAP 2.6, Revision 3	Pgs. 13-15			SAT	NI	
	QAP 2.8, Revision 2	Pgs. 17-20	CDAs #1 & #2		SAT	SAT	
	YAP-2.1Q Revision 2	Pg. 16			SAT	SAT	
	YAP-2.4Q, Revision 0	Pg. 36			SAT	NI	
	YAP-2.6Q, Revision 1	Pgs. 37-42			SAT	SAT	
	YAP-2.7Q, Revision 1	Pgs. 43-45			SAT	NI	
	YLP-2.1Q-YMSCO, Revision 1	Pgs. 25-35	CDAs #5 & #6	REC. #9	SAT	SAT	
3.0	YAP-6.1Q, Revision 0	Pgs. 47-48			SAT	NI	SAT
	YAP-3.7Q, Revision 0	Pg. 49			SAT	NI	
4.0	YLP-4.1Q-YMSCO, Revision 0	Pgs. 50-58			SAT	SAT	SAT
5.0	QAP 5.1, Revision 9	Pgs. 60-67	YMSCO-98-D-125		SAT	SAT	SAT
	YAP-5.1Q, Revision 4	Pgs. 70-72			SAT	SAT	
	YAP-5.7Q, Revision 1	Pg. 59			SAT	SAT	
	YAP-5.8Q, Revision 1	Pgs. 73-75			SAT	NI	
	YLP-5.1Q-YMSCO, Revision 2	Pgs. 21-24			SAT	NI	

**ATTACHMENT 2**  
**SUMMARY TABLE OF AUDIT RESULTS (Cont'd)**

QA Element	Document Reviewed	Details (Checklist)	Deficiencies	Recommendations	Program Adequacy	Procedure Adequacy	Overall
5.0 (Cont'd)	YLP-5.2Q-AMA, Revision 0	Pgs. 68-69			SAT	SAT	SAT
6.0	QAP 6.2, Revision 3	Pgs. 76-79			SAT	SAT	SAT
	AP-6.1Q, Revision 0	Pgs. 80-82	CDA #7		SAT	SAT	
7.0	QAP 7.2, Revision 2	Pgs. 83-87	CDA #3	REC. #6	SAT	SAT	SAT
	AP-7.4Q, Revision 2	Pgs. 88-89		RECS. #2 & #3	SAT	SAT	
	YAP-7.1Q, Revision 0	Pgs. 90-98			SAT	SAT	
10.0	YLP 10.1Q-OQA, Revision 1	Pgs. 99-106		REC. #4	SAT	SAT	SAT
	YLP 10.3Q-OQA, Revision 0	Pgs.107-115			SAT	SAT	
	YLP 10.5Q-OQA, Revision 1	Pgs.116-118			SAT	SAT	
	YLP 10.6Q-OQA, Revision 1	Pgs.119-124		REC. #5	SAT	SAT	
	YLP 10.13Q-OQA, Revision 1	Pgs.125-128			SAT	SAT	
	YLP 10.14Q-OQA, Revision 1	Pgs.129-130			SAT	SAT	
	YLP 10.16Q-OQA Revision 0	Pgs.131-132			SAT	SAT	
	YLP 10.17Q-OQA, Revision 0	Pgs.133-135			SAT	SAT	
	YLP 10.19Q-OQA, Revision 0	Pgs.136-138			SAT	SAT	
	YAP 10.1Q Revision 1	Pgs. 139-140			SAT	SAT	

**ATTACHMENT 2**  
**SUMMARY TABLE OF AUDIT RESULTS (Cont'd)**

QA Element	Document Reviewed	Details (Checklist)	Deficiencies	Recommendations	Program Adequacy	Procedure Adequacy	Overall
10.0 (Cont'd)	YLP 10.18Q-OQA, Revision 0	Pgs.141-142			SAT	NI	
11.0	YAP 11.1Q-OQA, Revision 0	Pgs.143-145			SAT	SAT	SAT
13.0	YAP 13.1Q Revision 1	Pg. 146			SAT	SAT	SAT
15.0	YAP-15.1Q, Revision 3	Pgs.147-150			SAT	SAT	SAT
16.0	AP-16.1Q, Revision 3	Pgs.151-155		REC. #7	SAT	SAT	SAT
	AP-16.2Q, Revision 2	Pgs.156-159			SAT	SAT	
	AP-16.3Q, Revision 1	Pgs.160-162		REC. #1	SAT	NI	
	AP-16.4Q, Revision 0	Pg. 163	CDA #4		SAT	SAT	
17.0	AP-17.1Q, Revision 0	Pgs.166-172	YMSCO-98-D-126 CDA #5	REC #8	SAT	SAT	SAT
	YAP-17.2Q, Revision 1	Pgs.164-165			SAT	SAT	
18.0	QAP 18.1, Revision 5	Pgs.173-176			SAT	SAT	SAT
	QAP 18.2, Revision 8	Pgs.177-182			SAT	SAT	
	QAP 18.3, Revision 2	Pgs.183-184			SAT	SAT	
SUPP. II	YAP-2.8Q, Revision 2	Pg. 46			SAT	NI	SAT
	YAP-SII.1Q, Revision 2	Pgs.185-187			SAT	SAT	
	YAP-SII.2Q, Revision 3	Pg. 188			SAT	SAT	
	YAP-SII.4Q, Revision 1	Pg. 189			SAT	SAT	

**ATTACHMENT 2**  
**SUMMARY TABLE OF AUDIT RESULTS (Cont'd)**

QA Element	Document Reviewed	Details (Checklist)	Deficiencies	Recommendations	Program Adequacy	Procedure Adequacy	Overall
SUPP. III	YAP-SIII.1Q, Revision 2	Pgs. 190-191			SAT	NI	SAT
	YAP-SIII.3Q, Revision 2	Pg. 192			SAT	SAT	
	YAP-SIII.4Q, Revision 1	Pg. 193			SAT	SAT	
	YAP-SIII.5Q, Revision 1	Pgs. 194-195			SAT	SAT	
	YAP-SIII.6Q, Revision 0	Pg. 196			SAT	NI	
SUPP. V	YLP-5.2Q-AMA, Revision 0	Pgs. 68-69			SAT	SAT	SAT
APPEN. C	QARD, Revision 8	Pgs. 133-135 & 147-150			SAT	NI	NI
<b>TOTAL</b>		<b>PAGES 196</b>	<b>10</b>	<b>9</b>	<b>SAT</b>		

**“DOCUMENTS REVIEWED” INCLUDE THE REFERENCED PROCEDURE OR PROCESS STEP AND THE ASSOCIATED RECORDS/OBJECTIVE EVIDENCE**

**LEGEND:**

CDA.....CORRECTED DURING AUDIT  
DR.....DEFICIENCY REPORT  
NI.....NOT IMPLEMENTED  
SAT.....SATISFACTORY  
UNSAT.....UNSATISFACTORY  
REC.....RECOMMENDATION